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ABSTRACT

The role of discourse in education, specifically in the science classroom, is discussed. The discussion is based on the idea that talk in the classroom is not an end in itself but a means for inquiry, exploration, even activity, and expression of concepts. A framework for analysis of classroom discourse is outlined. In this approach, discourse is viewed as a tool-kit for achieving the goals of activities and their constituent tasks. The framework provides categories for analysis of the sequential organization of discourse and a theoretical basis for relating text to its context. The framework is then applied to specific classroom episodes, to explain how activities and their constituent tasks are operationalized through discourse. Focus is placed here on the role of the teacher, at both macro and micro levels, in engaging students appropriately with the curriculum, and more specifically on the use of responsive, follow-up discourse to accomplish this. Ways in which teachers can change their practice to match goals and action better are identified. (MSE)

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DISCOURSE AS TOOL IN THE ACTIVITY OF LEARNING AND TEACHING

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[Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans, April 1994][1]

Schooling, as a form of socialization through culture-transmission, has been part of our culture for so long that we take for granted its abstract, sequestered nature and its almost total dependence on oral and written discourse. In fact, we may even see these features as constituting a particular advantage - as Bruner did, in presenting "Man, A Course of Study":

> It may indeed be that the important thing about school as now constituted is that it is removed from immediate context of socially relevant action. This very disengagement makes learning an act in itself and makes it possible to embed it in a context of language and symbolic activity. For now indeed it is the case that words are the major invitations to form concepts rather than the action concepts so aptly described [in descriptions of indigenous cultures]. Verbal understanding, the ability to say it and to enumerate instances, becomes the criterion of learning in such a context. (Bruner et al., 1966, pp.62-63)

Although Bruner himself would probably now qualify his erstwhile confidence in the value of making "learning an act in itself", and also its implied emphasis on individual achievement (Bruner, 1990), he certainly provides a convincing explanation for the extraordinary weight that, in the enactment of schooling as we know it, is carried by discourse and, in particular, by talk. In the sequestered world of the classroom, where students all too often read, write and speak as solitary individuals, with the teacher as both initiator and evaluator, words become substitutes for objects and events, and the most highly valued form of action becomes that of being able to 'do things with words'.

Add to this an uncritical acceptance by many educators of the conduit metaphor of communication, in which utterances carry thoughts as trucks carry coal (Reddy, 1979), and it is perhaps not surprising that early attempts to understand the role of language in learning and teaching treated the verbal component of classroom events as self-sufficient, and analyzed the talk as if, like a window, it gave direct access to what was going on in the learners' minds (Edwards, 1990).

But what if this view of learning as the increasing ability to send and receive messages containing more, and more complex, information about non-present objects and events is an aberration - a byproduct of the form that schooled learning has happened to take in Western culture? In many other cultures, learning is not treated as a separate activity; and, even in our own culture, this is rarely the case outside the classroom. Instead, it is recognized to be a concomitant of engagement in joint activity with help from other people. Nor, outside the

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classroom, is learning conceived of as a purely verbal affair; for being able to talk about a practice is no substitute for being able to engage in it effectively. Talk is a means, not an end in itself, and verbal information is valued not for the correctness of the way in which it is formulated but for its use as a means towards the achievement of some larger purpose.

If this is indeed the case, we might argue that, despite the lack of continuity between home/community and school in terms of the kinds of activities typically to be found in the two settings, and in the organization of opportunities for participation, the ways in which children actually learn in the two settings are not essentially different. Whether in school or out, learning is a function of the activities in which children engage; as Lave and Wenger (1991) put it, it is "an integral part of generative social practice in the lived-in world" (p.35). What we need to attend to, therefore, in order to understand the role of talk in the classroom, is not so much the talk per se, as the contribution it makes to the activities in which students engage in the "lived-in world" of the classroom, the actual structures of participation, and the functions that talk performs - along with other semiotic systems - in mediating the goals of these activities.

It is this sociocultural perspective that our research group has adopted, both in our collaborative inquiries with teachers, in which our aim is to explore ways of improving opportunities for learning in science, and also in our approach to the analysis of the observational data that we have videorecorded in these teachers' classrooms. In this paper, I shall try to address both these issues. In the first part, I shall outline the framework we are developing for the analysis of classroom discourse. Then, in the second part, through the examination of two particular episodes, I shall try to show how the framework can be used, to arrive at a fuller understanding of the role of discourse in the practice of education, as it is enacted in classroom teaching and learning, and to identify points of leverage for those teachers who wish to find ways of changing their practice in the interests of bringing it into closer touch with the "world of relevant social action".

The Primacy of Activity

Our starting point is the tri-stratal analysis of joint activity developed by Leontiev (1981) on the basis of ideas initially proposed by Vygotsky. The three strata are those of Activity, Action and Operation, each of which provides a different perspective on the organization of events. In any event-in-a-setting, the Activity that is being undertaken can be identified according to its motive - the 'object' in view that provides its driving force. In all societies, the most fundamental activity is that of satisfying the basic human need for food; in technologically developed societies, many 'work' activities, such as navigation, health care, automobile production, and so on, have specific motives but are also indirect means of carrying out the basic activity of obtaining food. In the classroom, the predominant activity is that of education, although, in practice, the object of this activity takes a range of varied, and sometimes mutually incompatible, forms. Unfortunately, however, in educational discourse, the term "activity" is typically used in a non-technical sense to refer to a relatively self-contained curricular event, often occupying one time-tabled lesson; so, in order to avoid terminological confusion, I shall from here on refer to the stratum of activity, as it applies to education, as the Practice of Education.[2]

The second stratum is that of 'Action', which is the perspective on an event which is afforded by considering the goal to be achieved. It is only in 'action' that an 'activity' is "translated into reality". In fact, many 'actions' are themselves made up of a sequence of 'actions' or 'sub-actions', some of which may be organized hierarchically. In the classroom, for example, the largest unit of 'action' which is readily recognized is a curricular unit, such as a social studies unit on a particular country or a unit of science on electricity. Such curricular units usually consist of a number of activities (using the term in its non-technical sense), one or more of which may occur within a time-tabled lesson and these, in turn, typically consist of a number of tasks, which themselves consist, in some cases, of a sequence of recognizable steps.[3] In many of the science activities we observed, for example, there were at least three tasks: setting up the activity through reviewing previous activities and negotiating the goal of the present activity and the procedures to be used; 'hands-on' work carried out by students working in groups; and a final reporting and discussion of the results obtained.

But even the stratum of 'action' is not directly tied to observable behavior. For that, we must invoke the third stratum, that of 'Operation', where the focus is on the particular means that participants use to achieve the goal of the 'action' to which they are consciously attending. As Leontiev (1981) points out, there are, for example, many ways of getting from one place to another, including walking, cycling or driving. Which means is selected, on any particular occasion, depends on the conditions obtaining in the situation, including the culturally accepted preferences for carrying out the 'action' in relation to the 'activity' which motivates it. In school, the 'action' of taking attendance, for example, can be performed in a variety of ways: calling out names and having students answer, counting the bodies present and then asking who is absent, and so on. The teacher's choice amongst these 'operations' will be motivated by wider considerations but, whichever is chosen, the same focal 'action' goal will be achieved.[4]

In distinguishing between the strata of 'action' and 'operation', Leontiev also introduces a second criterion. An 'action', by virtue of being goal-directed, requires that the actors give it their conscious attention. One of the defining features of an 'operation', by contrast, is that, as a means for achieving the goal of 'action', it is likely to be a well-practised routine, and therefore no longer in need of conscious attention. A corollary of this second distinction is that a pattern of behaviour that starts as an 'action' may, over time, become so routinized that it becomes an 'operation', to be deployed, when appropriate, in the achievement of a more molar 'action'. Leontiev cites the example of letter formation in learning to write. To begin with, the novice writer has to concentrate on forming each letter, making the correct shape with appropriately sequenced movements. At this stage, writing each letter functions as a significant sub-action in the overall 'action' of composing a message in order to communicate with an intended reader. With practice, however, the formation of individual letters becomes an 'operation' - as does the physical aspect of writing as a whole - which is performed automatically whenever it is called for in carrying out the 'action' of communicating in the written mode.[5]

However, the reverse movement can also occur. When difficulty is encountered in performing an 'operation' - as, for example, when writing with a paintbrush instead of a pen - it may be necessary to refocus on the 'operation' and attend to it once more as an 'action', until it again becomes automatic. In the classroom, such a 'stepping up' may be instigated quite deliberately when the teacher recognizes that an 'operation' is not being carried out

appropriately. An interesting example of such an event occurred during a science unit that we observed, when the teacher discovered that several groups of students had not made and recorded their predictions concerning the outcome of an experiment they were performing. Instead of proceeding with the next round of experiments as planned, the teacher decided on the spot to switch to a discussion of those predictions that had been made, in order to draw attention to the function of this 'operation' as well as to the manner in which it is performed (Wells, in press a).

At this point, then, it may be helpful to summarize the argument thus far. What I am suggesting is that classroom events are best understood as 'actions' which, organized as structured sequences of activities and tasks, enact the Practice of Education. However, whilst 'action' provides the organizing structure for classroom events and the goals and outcomes in terms of which they are planned, directed and evaluated, it is the stratum of 'operations' which accounts for the means by which these goals are attained. That is to say, at a level below full conscious attention, participants select from their repertoire of routinized behaviors the ones that they judge appropriate for the activity or task in hand and deploy them relatively automatically towards the achievement of that end.

Activity Systems and Communities of Practice

In the foregoing account, I have emphasized the realization relationship between the three strata but, like Leontiev, have said little about the ways in which an 'activity', and the 'actions' through which it is realized, is embedded in the cultural context in which it occurs. In the last decade, however, there have been a number of important proposals which situate 'activity' more dynamically in a world of interacting, self-renewing communities of practice (e.g. Lave and Wenger, 1991). For our purposes here, perhaps the most important is the construct of an activity system developed by Engestrom (1990, 1991; Cole & Engestrom, 1993).

Following Leontiev, Engestrom takes as his point of departure the basic mediational triangle, in which the incorporation of the tool as mediational means radically transforms the relation between a subject and the object of his or her 'action'. However, this model needs to be expanded, he argues, in order to understand the relationship between such isolated 'actions' and the ongoing cultural context in which they are embedded. For "if we take a closer and prolonged look at any institution, we get a picture of a continuously constructed collective activity system which is not reducible to series or sums of individual discrete actions" (1990, p.78). This enlarged model he represents as in figure 1, and he glosses it as follows:

[Insert figure 1 here]

> In the model, the subject refers to the individual or sub-group whose agency is chosen as the point of view in the analysis. The object refers to the 'raw material' or 'problem space' at which the 'activity' is directed and which is molded or transformed into outcomes with the help of physical and symbolic, external and internal tools (mediating instruments and signs). The community

> comprises multiple individuals and/or sub-groups who share the same general object. The division of labor refers to both the horizontal division of tasks between the members of the community and to the vertical division of power and status. Finally, the rules refer to the explicit and implicit regulations, norms and conventions that constrain actions and interactions within the 'activity system'.

In this expanded model, the individual 'action', represented by the top portion of the diagram, is related to the larger cultural and historical context by the relationships represented by the other triangles. For example, the subject-object relationship - that is to say, the subject's goal orientation - is modified by the cultural rules that apply to this relationship and by the division of labour in which it is embedded. These rules, or norms, might well include the tools considered appropriate to use, and the way in which control of their use is distributed among the different categories of community members who are regularly involved in this and related actions. However, these relationships are not static: they are continuously being constructed and reformulated in the course of their deployment in action.

A further important feature of the model is that, in addition to the incremental change just mentioned, it assumes that tensions exist between the different components of an 'activity system' that can occasionally give rise to major qualitative transformations of the system as a whole. As Engestrom puts it, "An activity system is not only a persistent formation; it is also a creative, novelty-producing formation" (1990, p.80).

In the present context, one of the particular virtues of this model, as I hope to show below, is that it enables comparisons to be made between quite different ways of enacting the practice of education and encourages a critical and innovative approach to teaching (Engestrom, 1991). It also draws attention to possible points of leverage in the attempt to overcome the sequestered nature of schooling. For example, changing the nature of the rules that prescribe the sorts of actions that participants engage in and the expected outcomes, modifying the division of labour, or valuing other tools in addition to the textbook - for example collaborative, exploratory talk - all create quite different 'activity systems', and ones that may encourage rather than resist student initiative and creativity.

Discourse as Semiotic Tool

Within this 'activity' framework, we see discourse as a tool-kit that is drawn on in achieving the goals of 'actions' and 'sub-actions' (or, in classroom terms, the goals of activities and their constituent tasks) (Cole, in press, Wertsch, 1991). This perspective is quite similar to that found in Halliday's systemic functional theory of language (Halliday, 1978, 1984) and, for this reason, our approach to the analysis of discourse draws heavily on his writings. As Leontiev argues, tools have a central role in the theory of 'activity', for "the tool mediates activity and thus connects humans not only with the world of objects but also with other people" (1981, p.55). And as Halliday (1993) points out, as a semiotic tool, language is admirably organized for this purpose, for any individual act of meaning can be seen as simultaneously involving two functions. On the one hand, choices with respect to the ideational metafunction encode the aspect of experience (including the "world of objects") that the speaker is representing and, on the other, choices with respect to the interpersonal semantic metafunction encode the

speaker's relation to his or her interlocutors.

Acts of meaning do not occur in isolation, however, but as contributions to 'texts' - that is to say, to discourse - which involve exchange of meanings between participants in order to perform some function(s) in a specific situation. It is thus texts rather than individual utterances that constitute the tools that are used in mediating 'activity'. In order to articulate this functional theory of discourse with the theory of 'activity', therefore, it is necessary to specify briefly how texts are constructed and then to consider the relationship between the analytic categories of the two theories.

Categories for the analysis of the sequential organization of discourse

In the construction of a text, the smallest building block is the Move, for example a 'question' or an 'answer'. However, it is the Exchange, in which, over the two moves, expectations are set up and met, that constitutes the minimal unit of spoken discourse. Every exchange consists of an Initiating move and a Response move (which may be non-verbal); under certain conditions, there may also be a third, Follow-up, move. Moves are also categorized according to their function. Functions associated with Initiating moves include: Demand, Offer, Request Information, Request Justification, etc.; those associated with Response moves include: Inform, Suggest, Justify, etc.; and those associated with Follow-up moves include: Acknowledge, Evaluate, Extend, etc.[6]

Exchanges are of two types: Nuclear exchanges, which contribute substantive content to the discourse, and Bound exchanges, which - as the label implies - are not free-standing but depend on the nuclear exchange in some way. The most important of these is the Dependent exchange, in which some aspect of the nuclear exchange is developed through further specification, exemplification, justification, and so on. A second category of bound exchange is the Embedded exchange, which deals with problems in the uptake of a move in the current exchange, for example, a need for repetition or identification of a referent. (These are what Jefferson (1972) refers to as 'side sequences'.) There are also Preparatory exchanges of various kinds, such as the Bid-Nomination exchange in whole-class question and answer sessions.

The unit that includes a single nuclear exchange and any exchanges that are bound to it we call a Sequence. A sequence can thus be defined as all the moves that are required to fulfill the expectations set up by the initiating move of the nuclear exchange. In general, a new sequence can be identified by the occurrence of a move which initiates a new nuclear exchange. In a discourse involving multiple participants, a sequence can extend over a considerable number of moves, as more than one participant can respond to the original initiation, and each of these moves may give rise to a dependent exchange.[7]

[Insert Figure 2 about here]

The relationship between the three levels can be shown schematically as in Figure 2, where dotted lines and parentheses indicate that a category is not obligatory. In Table 1, I indicate the alternatives that can occur at each level, together with typical functions.

[Insert Table 1 about here]

The sequential organization of discourse: two examples

In this section, I introduce two episodes of discourse from science activities in elementary classrooms. In the second part of the paper, I shall analyze them in terms of the framework as a whole. For the present, however, I introduce them in order to illustrate how episodes of discourse can be analysed in terms of the categories described above. The first occurred in a Grade 4/5 class, at the beginning of an early lesson in a unit on weather. The teacher is conducting a discussion with the whole class and starts by referring to written questions on the topic that the students have already generated.

Example 1

		Sequence 1
26	Here are all your ideas about how we can learn about	
27	weather, the different things that we can do ..	
28	What I'm wondering about is how should we go about this,	
29	like if we're having a weather time to work on weather,	
30	what should we be doing during that time?	
31	How should we go about learning using all these different	
32	things?	Nuc. I Req. Suggest
	[Several hands go up, including Jenny's]	Emb. R/I Bid
33 T:	Jenny?	Emb. R/I Nomination
34 J:	We should make a few groups and then one group	Nuc. R Suggest
35	does weather from books using those little fact	
36	sheets and then say the other group gets it from	
37	um a movie or from film- from like film slides	
38	or from all different places, from experimenting,	
39	so there's several groups doing things and then we trade.	
40 T:	OK	Nuc. F Acknowledge
		Sequence 2
41 T:	Another idea?	Nuc. I Req. Suggest
	[Several hands up, including Lyndsey's]	Emb. R/I Bid
42 T:	Lyndsey?	Emb. R/I Nominate
43 L:	Maybe you could have games ** (inaudible)	Nuc. R Suggest
44 T:	OK	Nuc. F Acknowledge
45	Maybe some people would like to make up some games	Reformulate

46	about the weather that would allow you to learn.	
47	Uhhuh.	Acknowledge
		Sequence 3
48 T:	Other ideas about how we can go about this?	Nuc. I Req. Suggest
49 S:	We can like look in newspapers and stuff ** -	Nuc. R Suggest
50 T:	OK	(backchannel)[8]
51 S:	- see if we can find articles or something like	
52	magazines or something.	
53 T:	Great	Nuc. F Ack/Evaluate
54	So I'd like you to start looking in the newspaper	Extend
55	and when you find articles about weather you could	
56	cut them out and bring them in ..	
57	Ask first to make sure that whoever at home reads	
58	the paper is finished with it.	
59	But that's a great idea, Salina.	Evaluate
		Sequence 4
	[Roisin has her hand up]	Pre. I Bid
60 T:	Roisin?	Pre. R/I Nominate
61 R:	You could- um you could cut into different	Nuc. R Suggest
62	groups and um you could like look in books and **	
63	in videos and <for every>- for every group <they get	
64	to> um they get to make their own presentation at	
65	the end of the unit they make a presentation.	
66 T:	OK	Nuc. F Acknowledge
67	and actually I thought it might be really fun for	Extend
68	you guys to do some presentations at the end for	
69	the younger children in the school . and maybe you	
70	could set up some displays about what you learned	
71	and some experiments and then we could invite the	
72	younger children to come in the room to see what	
73	you've done and to learn from what you've done	
74	instead of just presenting to each other.	

At this point, the discussion moves on to a consideration of possible participant structures, and there is some debate about whether it would be good or bad to work in friendship groups. The whole discussion, which lasted for some 400 lines, continued in this mode throughout.

The second episode occurred in a Grade 6 class, as a visiting teacher (T) joined three students, Nir, Vi-Hung and Ian, who were formulating questions for the next stage of their inquiry into the metamorphosis of some painted lady caterpillars.

Example 2

		Sequence 1
62 I:	What happens in the-	Nuc. I Propose
63 N:	- inside the chrysalis	(candidate question)
64 T:	What happens inside?	Emb. I Check
65 Ss:	Yeah	Emb. R Confirm
66 I:	Well the change- ..	Dep. I Reformulate
67 N:	- how does it change?	Dep. I Reformulate (cont.)
68 V:	Yeah	Dep. R Confirm
69 I:	I know they change but-	? (no uptake)
70 T:	That's- that's a really interesting question	Nuc. R Acknowledge +
71	because when they go in they're caterpillars	Comment
72	and when they come out they're butterflies	
73	so SOMEthing must happen in there	
		Sequence 2
74 I:	How do they eat?	Nuc. I Req. Information
75 N:	Well they can go out through their *	Nuc. R Inform
76 T:	Well, when you say "how do they eat" you're	Dep. I Indirect Challenge
77	making an assumption that they DO eat	
78 I:	I know they eat when they're not in the chrysalis	Dep. R Qualify
79 T:	HOW do you know?	Dep. I Req. Justification
80 I:	Well, ** food	Dep. R Justification
81 T:	What did you see that makes you think they	Dep. I Req. Justification
82	eat when they're in the chrysalis?	
83 I:	**	Dep. R (not heard)
84 T:	Pardon?	Emb. I Req. Repetition

85	Sorry, I didn't hear . say it again	
86 I:	Do they eat?	Emb. R/Dep. I Req. Inform.
87 T:	Do they?	Emb. I Check
88 I:	Yeah,	Emb. R Confirm
89	like is there food for them in the chrysalis?	Dep. I Reformulate
90 T:	Well, wait a minute, there are two ways you	Dep. R Clarify
91	can think about this: does the chrysalis go	
92	to its- the chrysalis make contact with food	
93	outside itself?	Dep. I Req. Pos/Neg
94 I:	No	Dep. R Neg
95 T:	Okay	Dep. F Acknowledge
96	So . so if the chrysalis feeds inside the	Dep. I Req. Information
97	chrysalis, what would the food be?	
98	Where does it come from?	
99 I:	**	Dep. R1 (not heard)
100 N:	I think that they like ate, they ate a lot to	Dep. R2 Inform
101	get energy to change inside the chrysalis ..	
102	so I think they were eating the- like * for	
103	seven days and they almost ate the food you	
104	see there's almost none left ..	
105 T:	Uh-huh	(backchannel)
106 N:	and- and now it's got like a lot of energy	
107	to change and it's changing inside ..	
108	That's what I think	
109 T:	So you're- you think it doesn't need food	Dep. I Reformulate
110	during THIS stage because it's already stored	Req. Pos/Neg
111	a lot?	
112 N:	Yeah	Dep. R Confirm
113 T:	Yeah	Dep. F Acknowledge
114 N:	What do YOU think?	Dep. I Req. Opinion
115 T:	What do I think?	Emb. I Check
116	I think I agree with you	Dep. R1 Give Opinion

117 I: I think I agree with you too Dep. R2 Give Opinion

Several more sequences of a similar kind followed, culminating in a sequence in which the appropriateness of a proposal by Nir was discussed: he suggested that the best way to answer the question about what was happening inside the cocoons would be to dissect one every other day until the butterflies began to emerge. At this point, the teacher called the students back into the classroom and the Episode came to an end. After a lengthy discussion, in which the whole class participated, it was finally decided that Nir should be allowed to carry out a dissection of a cocoon that seemed to have died and, the following day, with help from some of his peers, Nir went ahead with the autopsy (Wells, 1993b).

Relating text to its context of situation

Let us turn now to the way in which these sequences, and the episodes that contained them, might be related to the situations in which they occurred. Systemic theory provides two perspectives on this relationship. The first is referred to as Register, which Halliday (1975) defines as "a particular configuration of meanings that is associated with a particular situation ... the range of meanings that is activated by the semiotic properties of the situation" (p.126). These properties, he proposes, can be grouped into three clusters, which provide the dimensions in terms of which particular situations can be classified according to types. The three dimensions are: Field (what is going on), Tenor (the participants, their roles and statuses), and Mode (the part that language plays in the event). Each of these dimensions maps on to one of the semantic metafunctions of the language system, respectively, Ideational, Interpersonal and Textual. It is this mapping that accounts for the bidirectional predictability that obtains between situations and the texts that are constructed in relation to them.

Even without my brief introductory descriptions of the settings for the two examples just presented, it would not have been difficult for a reader of the transcripts to construct images of the situations in which they most probably occurred. The first text, in particular, contains many features that are functionally associated with activity settings in which one adult leads a discussion with a large group of children with a pedagogical purpose in mind. Conversely, for the participants in each case, it was their 'reading' of the situation as being of a particular type that enabled them to interpret the functions of each others' moves and to make appropriate contributions of their own that further defined and extended the activity in progress. Thus, as Halliday (1978) explains: "The context plays a part in determining what we say; and what we say has a part in determining the context" (p.3).

The second perspective provided by systemic theory is that of Genre. Taken from the field of rhetoric and written discourse, the concept of genre has been extended to explain the functional-sequential organization of all linguistic texts. A genre, according to Martin et al. (1987) is a "staged, goal-oriented, social process", and for Hasan (1991) genres are "purposive ways of doing things in a culture, and in that sense may be thought of as artifacts of the culture" (p.205). Hasan (1985) gives the example of making a purchase in a fruit and vegetable store. This genre consists of certain elements, such as sale inquiry, purchase, etc., which are obligatory and fixed in order; other elements, such as greeting, are optional, and some may be recursive.

One way of understanding the relationship between these two perspectives, is that register accounts for the sorts of things that are likely to be said in particular types of situation, and genre accounts for the sequential organization of what is said in order to achieve the goal of the event in the situation.[9] Together, they define what things can be done in a culture, and how, with the use of the semiotic tool-kit of language At present, however, these perspectives are still somewhat programmatic in nature. They provide a way of thinking about the relationship between texts and situations, but not yet a taxonomy that is ready-made for use in the analysis of naturally occurring data (but cf. Lemke, 1990; Martin, 1992).

Nevertheless, as the preceding summary account should make clear, the general orientation of systemic linguistic theory is such that it should be possible to articulate it with 'activity' theory in order to construct an analytic tool for the description of classroom events that is more powerful and comprehensive than that which is provided by either theory alone. In the next section, I shall provide a sketch of how I envisage this articulation might be achieved.

Relating Action and Genre

The most obvious point of intersection between the two theories is to be found in the notion of "goal-oriented social process". As we have seen, this is the way in which both 'action' and Genre are conceptualized. Both are concerned with patterned ways of doing things that are culturally recognized; both are structured in terms of the goal in view; and both require for their realization the strategic deployment of relatively routinized forms of behavior that are appropriate to the prevailing conditions. In fact, the two categories seem to be almost identical, differing only in the extent to which the focus is specifically on the linguistic processes involved. This is the perspective adopted in Lemke's (1990) study of science classrooms, where he uses the term "genre" more or less interchangeably with "activity" in describing such recurring constituents of lessons as 'seatwork', 'going over homework', 'teacher exposition', or 'teacher-student debate'. On this basis, I shall propose that a genre is best thought of as an 'action-type' that is viewed from the perspective of its linguistic realization.

This naturally raises the question as to how these two categories of 'action' and genre should be related. The answer we have adopted is suggested by focusing on the tool-like nature of discourse. As Cole (in press) puts it, drawing on a strong tradition in sociocultural theory, language is the "tool of tools"; it allows us both to intervene in social action to shape and direct it and also to represent that action and the world in which it occurs in a 'theory of experience'. As Halliday (1993) puts it, "meaning is at once both doing and understanding" (p.100). On this reading, genres are items in the linguistic tool-kit; their use constitutes the means whereby 'actions' are 'operationalized'.

In attempting to categorize these different types of 'operation', a useful initial distinction to make is that between events in which the discourse plays a role that is ancillary to the 'action' goal to be achieved and those in which the discourse is itself constitutive of the 'action'. An example of the former would be the talk that accompanies and monitors the preparation of a meal or the carrying out of the practical part of a science experiment; in both these cases, it is the goal of the material action that is the focus of attention and the function

of the discourse is to facilitate the achievement of this goal. By contrast, in events such as a committee meeting or a discussion in which the results of an experiment are interpreted and evaluated there is no material action other than the talk, and the goal is both established and achieved through the medium of the appropriate discourse. In this latter situation, the distinction between 'action' and 'operation' is more difficult to draw. However, even here, it is useful to think of 'action' as focusing on the outcome to be achieved, and of 'operation' as focusing on the situation-specific ways in which the discourse is co-constructed as a means of achieving that outcome (Wells, 1993).

Discussing this distinction, Martin (1992) refers to the two categories as "field-structured" (i.e. structured by the action that is in progress) and "genre-structured" (i.e. organized in terms of the conventional organization of a particular genre), although he is quick to point out that this is a matter of emphasis rather than one of mutual exclusion, for "all texts realise both field and genre" (p.589). Nevertheless, it is the case that the traditional concept of genre seems to apply much more readily to texts that are constitutive of the events in which they occur, particularly more formal events in which there is a culturally accepted 'model' of the kind of (written) text that the participants are attempting to construct.

Certainly, the interpretation of genres as the means by which 'action' is 'operationalized' - as the tools which are used - seems particularly appropriate when thinking about written genres. As Bazerman (n.d.) shows, in his study of the different genres that are involved in the 'activity' of obtaining a patent, it is through the appropriate use of the written genres that the constituent 'actions' are performed and the overall object achieved. However, oral genres may also function in similar fashion in certain activities that involve face-to-face interaction. For example, in the formal setting of a trial, there are such clearly defined genres as cross-examination of witnesses, the defence counsel's closing speech to the jury, and the judge's summing up of the evidence. In such cases, there is a culturally recognized pattern to be followed involving obligatory elements which must occur in a certain order (Hasan, 1985/89).

However, in most face-to-face interactions, this sort of conformity to preexisting generic patterns of discourse organization is the exception rather than the rule - at least at the level of 'action' comparable to the written genres in the 'activity' of patent granting. For example, the deliberations whereby the jury arrives at a verdict constitute a recognizable 'action' in the overall 'activity' of trial by jury, but the cases must be rare in which these deliberations follow a predetermined pattern. The same is true of most classroom interaction. Recognizable 'actions' - what I earlier referred to as classroom activities - such as reviewing work done on a topic to date, or carrying out an experiment, occur with considerable frequency, but the discourse through which they are 'operationalized' does not follow the same pattern from one occasion to another; there are few, if any, obligatory elements, and a minimal degree of order in which occurring elements must be arranged.

Yet this does not mean that oral discourse is usually random and disorganized. If it were, it would be ineffective in enabling the goals of collaborative action to be achieved. Rather, the organizational structures to which participants orient operate at a lower level, corresponding to the tasks and steps which make up the superordinate 'action'. In other words, where 'action' is realized through oral discourse, the patterns through which it is 'operationalized' are most frequently to be found at the levels of sequence, exchange and move.

Viewed from the perspective of the participants functioning as a group, the most significant unit is the discourse sequence - the talk by means of which an interim goal is achieved. Examples would include such minimal goals as A discovering the time of day by consulting B, or a teacher asking a display question and students proffering answers until one is accepted as correct; or inviting suggestions as to how to carry out some task and commenting on each as it is offered in a succession of related sequences, as in the first example above. An example involving a more complex goal is seen in the second example, where what starts with an apparently simple request for information, "How do they eat?", gives rise to a string of exchanges in which the presupposition of the question is challenged and an alternative interpretive framework proposed within which a tentative answer is suggested and accepted.

What the choice of this unit of analysis brings out is the essentially collaborative nature of oral text construction, in contrast to the more individually controlled creation or reception of a written text. For, although the 'point' of the sequence is typically proposed in the initiating move of the nuclear exchange (e.g. the offering of an interesting piece of information, a request for explanation, or the elicitation of suggestions), its satisfactory completion requires contributions by at least one other participant that appropriately meet the expectations set up by the initiating move. Furthermore, since there are many appropriate ways in which to respond to the initiating move - not all of them anticipated or anticipatable by the initiator - the precise meaning that is made in a sequence can never be determined until the sequence is concluded; and, since it is this meaning that typically forms the point of departure for the sequence which follows, no single participant - except when constructing an extended nonologue - can ever control how the discourse will develop beyond the current move. Thus, dialogic discourse - even when one participant has unequal topic control - is co-constructed sequence by sequence; it both depends on, and further develops, the intersubjective agreement between the participants about the interactional goal to which they are orienting.

Nevertheless, the very fact that sequences are for the most part smoothly negotiated to a conclusion provides strong evidence for the existence of generic structures at this level, to which participants orient in making their sucessive moves. The one that has received the most attention in educational research is the three-part structure that Lemke (1990) refers to as 'triadic dialogue'. As its name implies, this structure consists of three obligatory elements, Initiation, Response and Follow-up, which must occur in this order. However, as I have shown elsewhere (Wells, 1993), there is a whole family of sequence-types which share this triadic structure; most often they co-occur with unequal topic control, but they differ with respect to the values selected on each of the other parameters. In fact, it is only when the focus is on 'right answers' that the IRF structure has Evaluation as the function of the third obligatory move; in other triadic sequence-types, this move is used to perform a variety of functions, ranging from a brief acknowledgement to an extension of the response move with an example or an explanatory gloss. In the example quoted above, in which the teacher led the class in the exploratory planning of a unit on weather, the whole episode was conducted in triadic dialogue, but the follow-up move was hardly ever used to perform an evaluative function.

In the present context, however, the important point is that these different sequence-types are readily recognized by members of a discourse community in which they frequently occur. And so, by orienting to the sequence-type's organizational structure, participants are able to determine what sorts of moves are permitted or required at each stage and so to contribute

appropriately to the meaning that is being jointly constructed. Thus, whether we refer to them as 'microgenres', or by some other term, it is clear that, as with the more familiar genres of written discourse, the culturally recognized patterns in terms of which they are organized enable them to function as tools in the 'operationalization' of 'action'.

Describing Discourse in the Classroom

How, then, might we bring the concept of genre to bear in an attempt to understand the way in which activities and their constituent tasks are 'operationalized' through discourse in the great variety of events that occur in the course of a typical day in the classroom, particularly in inquiry-oriented classrooms where student initiative is encouraged and where participation structures are constantly changing? At this point, we have no final answer to this question, but we believe that the best strategy is to work at several levels simultaneously. In the foregoing paragraphs, I have indicated how we are attempting to identify microgenres at the level of sequences. In a later section of this paper, I shall have more to say about the way in which teachers strategically use dependent exchanges within sequences to follow up on student contributions. Here, however, I want to to describe the way in which we are attempting to identify the parameters that need to be taken into consideration in characterizing the different modes of discourse that occur at the level of episode.
Let me start by defining an episode.

As has already been stated, the basic assumption on which our analysis is premised is that discourse is best understood as a tool that is used to mediate the achievement of the goal of 'action'. The first step in our analysis is therefore to segment the stream of discourse according to the constituent tasks and steps that make up the activity in relation to which the discourse occurs. Depending on the scope and complexity of the activity, there may be few or many tasks, each of which may consist of one or several steps, with stronger or weaker implicational relationships between them. Within this 'action' framework, an episode is defined as the talk that occurs in relation to a task (or, in some cases, a step), as a means - ancillary or constitutive - for achieving the goal of that task.[10] With the evidence provided by field notes and video tape, a number of cues are available for deciding where boundaries occur and for determining the goal. However, there is no doubt that the discourse itself provides some of the strongest cues for making these decisions although, as has frequently been noted, these cues do not always converge on a single, unambiguous determination (see Wells, 1993a for a discussion).

For each episode identified in this way, coding decisions are made with respect to four parameters. The first of these we call Topic Control. Possibilities on this dimension range from (1) extended monologue, through (2) unequal dialogue (in which one of the participants assumes or is granted the right to allocate turns and decide which contributions will be incorporated into the development of the topic), (3) dialogue (in which control is negotiated on an ongoing basis) to (4) multi-party dialogue (in which more than one topic may be in play over adjacent turns). Closely related to, and interacting with, topic control is Topic Focus. Here, the alternatives range from (1) discourse where there is a "right answer", usually determined by whoever controls the topic, through (2) convergent, or concensus-seeking, to (3) open, exploratory talk, to (4) the unfocused talk that is most likely to occur in multi-party discourse.

The third parameter picks up the ancillary v. constitutive distinction, but treats it more as a continuum, with the following focal points: (1) (social) talk accompanying material action; (2) directing action; (3) planning action; (4) commenting on ongoing action; (5) reconstructing past event(s); (6) generalizing; (7) field construction; (8) theorizing. As Martin (1992) notes, the last two points, unlike all the preceding, are not organized around a sequence of events; instead, they construe experience in terms of abstract categories and the relationships between them. They thus represent a 'synoptic' as opposed to a 'dynamic' perspective on experience, which is the form, par excellence, in which "schooled" knowledge has traditionally been formulated (Halliday, 1993).

The fourth parameter concerns the Dominant Function(s) performed by the successive sequences that make up the episode. These include such functions as directing, suggesting, narrating, explaining, hypothesizing, proposing, etc., which are coded with respect to the nuclear exchange of each sequence. Although these terms might seem to describe individual speech acts (Searle, 1969), we see them, as explained below, as referring to complete sequences rather than to individual moves. However, we are far from having a complete taxonomy of mutually exclusive categories; indeed, our approach here is still somewhat exploratory, as we consider it to be an open question as to whether such a taxonomy can be constructed. Nevertheless, in a high proportion of episodes, one or a very small number of functions is found to recur, making it possible to assign a dominant function to the episode as a whole.[11]

At present, we are attempting to characterize particular episodes of discourse in terms of these four parameters. Some episodes turn out to be strongly internally consistent. For example, in the Grade 4/5 discussion, from which the first example above was taken, the whole episode was devoted to a discussion of how the class might set about studying the topic of weather. Throughout, the teacher controlled the topic, but with an open focus; the goal was to plan future action, both material and symbolic, and the dominant function was suggestion. Other episodes, such as the second example above, are much more varied, involving shifts on several parameters, while still remaining coherent and purposeful. When we have completed coding episodes in this way, we shall begin to look for patterns of co-occurrence, both among the discourse categories and between these and the categories in terms of which the activities and tasks are categorized. If speech genres comparable to the written genres discussed by Bazerman (n.d.) occur in lassroom discourse, it seems likely that it is at the level of episode that they will be found. However, as yet, we are not in a position to make a judgment on this issue.

Part 2. Applying the Framework: Exploring the Significance of Follow-Up

In the discussion so far, I have been concerned to show, in general terms, how different modes of discourse can be conceptualized, within an 'activity theory' framework, as a tool-kit that is utilized to perform the 'operations' through which the goals of 'action' are achieved. Although several of my examples have been drawn from observations in classrooms, I have not as yet explicitly addressed the ways in which discourse is organized to serve a specifically teaching function. To do justice to this topic is obviously beyond the scope of this paper, but there are two aspects of our approach that warrant at least some consideration. The first concerns our conceptualization of the teacher's role.

In the ongoing debate about the goals of education, there are two main candidates. The first of these is cultural reproduction - the transmission to successive generations of the valued resources of the culture so that they will be able to contribute productively and responsibly, in their turn, as members of the workforce and of the larger society. The second objective is the development of individual members in such a way that they are enabled to achieve their full potential as human beings and to make original, and possibly divergent, contributions to the society of which they are members. Unfortunately, in the public discussion of this issue in the media, particularly as it applies to schooling, these two objectives are often treated as being theoretically incompatible and, in practice, this all too frequently proves to be the case.

From a sociocultural perspective, however, these two objectives, far from being in conflict, are seen to be both necessary and dialectically interrelated. In this view, individual development is only possible through increasingly full participation in ongoing communities of practice (Lave and Wenger, 1991) and this, in turn, involves the appropriation of the cultural resources that mediate those practices (Rogoff, 1990). However, appropriation is not a matter of simple reproduction. On the contrary, it is essentially transformative in its effects (Engestrom, 199). As newcomers engage in joint activities with other members of the culture, they are transformed in terms of their understanding and mastery of the community's practices and in their ability to participate, and this, in turn, transforms the community into which they are being inducted. Furthermore, as newcomers become progressively more able to engage in the solution of the problems that the community faces, they may contribute to a transformation of the practices and artifacts that are employed and this, in turn, transforms the community's relationship with the larger social and material environment.

How such an understanding of the transformative nature and purpose of education might be realized in the institution of schooling is currently a matter of considerable debate among theorists and practitioners for, in order to have any impact, 'idealistic' visions derived from theory have to accommodate to the very varied realities that obtain in particular schools and educational jurisdictions, and these are themselves sites of debate and change. Specific proposals as to how schools should be organized are inevitably contentious, therefore, and the same will no doubt be true of our way of conceptualizing the teacher's role. Our proposal must therefore be seen as being both tentative and transitional.

The Two Levels of Teaching

Our conceptualizion of the teacher's role is based on two assumptions: that schooling should provide an apprenticeship into the semiotic practices - the ways of making meaning - that are valued in the culture; and that teaching-and-learning involves an essentially dialogic relationship (Wells, in press c). However, this is not a dialogue between equals. Both by virtue of his or her status as an employed representative of the community, and as a result of personal experience and education, the teacher must play a different role from that of the students in the classroom community. As leader and guide, it is the teacher's responsibility to ensure that the student members engage with the mandated curriculum and that they are assisted to appropriate it as effectively as possible both as a resource for their own current and future purposes and so that they may be productive members of the society in which they are growing up. How this dual responsibility is realized in practice can be conceptualized as

involving two levels of activity, the 'macro' and the 'micro' (Wells, in press b).

At the macro level, the teacher is the chief initiator and is responsible, among other things, for selecting the themes for curricular units and the activities through which they are to be addressed. These decisions should be based both on knowledge of the students' interests and current levels of participation and on expectations concerning the semiotic resources that such themes and activities are likely to call into play. They should also include ensuring that the necessary resources are available or discovering where they can be obtained. In this initiating role, the teacher is also responsible for leading whole class meetings in which theme and activities are introduced, students presented with appropriately pitched challenges, expectations made clear and, in due course, both processes and outcomes evaluated and reflected upon.

At the micro level, by contrast, teaching can be characterized much more in terms of response. Having created the setting and provided the challenge, the teacher observes how students respond, both individually and collectively, and acts to assist them in whatever way seems most appropriate to enable them to achieve the goals that have been negotiated. It is thus at the micro level of teaching, when working with individuals or small groups of students, that the teacher is best able to practice the sort of teaching that Vygotsky (1987) characterized as 'working in the student's zone of proximal development'.

These are the requirements, we would suggest, that, ideally, all teachers should meet. However, in deciding how to meet them, they have a considerable amount of discretion. For, although the teacher must act as leader, leadership does not have to be exercised in a directive manner; and although the teacher is ultimately responsible for the goals to which 'action' is directed and for monitoring the outcomes, seen in terms of students' increasing mastery of valued cultural artifacts and practices, it is still possible for students to have a significant involvement in both these processes. Here, then, is the teacher's opportunity for professional growth and creativity - in constantly trying to find more effective ways of fulfilling her or his responsibilities both to the wider society and to the particular students who constitute the community of the classroom.

A major part of this responsibility is to engage the students in a semiotic apprenticeship into the actions and discourse genres that constitute the ways of making meaning in the different disciplines (Wells, in press c). In fact, it is this outcome that should guide the choice of activities within curricular units, as it is only when students engage in activities in which these genres constitute the appropriate tools for mediating the achievement of the activity goals, that they will have the opportunity to master them through genuine participation. Ensuring that such opportunities occur clearly constitutes a central component of what I earlier called the macro level of teaching.

At the micro level, it is in the moment-by-moment co-construction of meaning in the sequences and episodes of discourse through which these activities are realized that the craft of teaching is found. In particular, I would suggest, it is through the strategic use that he or she makes of the opportunity to follow up on students' contributions that the teacher most effectively facilitates their entry into the relevant discourse communities. It is to a consideration of this aspect of discourse that I now wish to turn in order to illustrate the application of the framework presented in the first part of this paper.

The Follow-Up: Teaching as Responsive Intervention

Some years ago, when I was trying to develop the thesis that children's increasing mastery of their first language occurs as a result of their participation in conversations about the events that constitute their everyday experience, I became interested in the conversational strategies that parents employ to extend the conversational topic beyond one single-exchange sequence (Wells, 1981). One group of strategies, in particular, caught my attention. Simply put, these strategies involve making the response move in the first exchange act as a pivot for two linked exchanges.

Typically, in the early stages, it is the child's initiating move which is responded to in such a way that it calls for a further response. In the following sequence, recorded when Mark was 23 months old, his mother uses three such strategies. In (2), she implicitly acknowledges Mark's topic-initiating informing move by asking a dependent question; in (4), she offers an alternative interpretation of what the birds are doing and invites Mark to confirm it; and in (6), she extends the agreed upon proposition about the birds eating the berries.

Example 3.

1	Mark:	Jubs (=birds)	Nuc. I Inform
2	Mother:	What are they doing?	Nuc. R (Ack)/Dep. I Req. Information
3	Mark:	Jubs bread (=birds eat bread)	Dep. R Inform
4	Mother:	Oh look they're eating the berries, aren't they?	Dep. I Reformulate + Req Confirm
5	Mark:	Yeh	Dep. R Confirm
6	Mother:	That's their food . they have berries for dinner	Dep. I Extend
7	Mark:	Oh	Dep. R Acknowledge

(Wells, 1986, p.102)

However, these strategies for sustaining the conversation can equally well be seen as a form of teaching, in which the adult encourages the child to add more information and then modifies and extends his attempt. And, because it is the child who has initiated the topic, the adult can be reasonably certain that there is intersubjective agreement about the current focus of attention and that, as a result, the new information will be (at least partially) understood.

In the classroom, where there are 30 children for the teacher to interact with, it is impossible to adopt the same strategies - at least when interacting with all of them simultaneously. In this context, an alternative is for the teacher to initiate the sequence with a move that simultaneously specifies the topic and invites one of the students to contribute further

information; then, following the student response, the teacher can add a further move to confirm, clarify or extend the proposition that has been co-constructed in the nuclear exchange. The following is a very clear example of this strategy. The teacher is reviewing a six-week science unit in a Grade 3 classroom, in which the children have engaged in a variety of practical activities that involved constructing artifacts for measuring time. The teacher starts the review by asking: "So what have you learned about time?" Immediately, hands go up and ideas are volunteered. Here is the second sequence:

Example 4.

4 T:	What else did you learn about time?	Nuc. I Req. Information
5 J:	We learned that it- um . you don't necessarily have the um . the clo- the watches like um the minute hand, the hour hand, the second hand, you can also- you can also use water and things like that, construct watches and um . construct clocks and it doesn't have to be um um someone special makes them to be *	Nuc. R Inform
6 T:	Uh-huh, right, so a timing device like a clock or watch may not have the minute or hour hand, you can use the water . to represent the minute hand, for example	Nuc. F Acknowledge Extend

(Wells & Chang-Wells, 1992)

As can be seen, from a functional and pedagogic perspective, there is considerable similarity between this sequence and the one in which Mark and his mother talked about the birds. Although they differ in who initiates the topic which forms the point of departure for the adult question, in both cases the response received is further responded to in the following adult move. Yet, despite this similarity, the two sequence types would, in most work on classroom discourse, be analyzed very differently. The former - if it was discussed at all - would be treated as a succession of topically related exchanges, whereas the latter would be treated as a single instance of a triadic dialogue exchange, with the structure: Initiate - Response - Evaluate. There is an alternative analysis, however, which allows the two sequence types to be treated as variants of a single more general discourse structure.

It is a very general principle of conversation that, within an exchange, moves decrease in 'prospectiveness' (Wells, 1981). The most strongly prospective move is a Demand, which requires a Give in response. A Give is less prospective: it expects but does not require a response. Least prospective is an Acknowledge, which always occurs in response to a more prospective move but itself expects no further response. The scale is thus ordered D>G>A and there are two basic exchange types:

Exchange: Scale of Prospectiveness

(i) D-G-A

D: Did you hear the forecast for today?

G: They said there'd be snow later
A: Ugh!

(ii) G-A
G: The forecast says there'll be snow today
A: Oh

Conversation that was made up only of such sequences, that each consisted of a basic nuclear exchange, would perhaps be efficient, but it would not be very interesting. Nor would it provide a very rich opportunity for learning about the ways in which community members conceive of objects and events being related to each other.

In practice, however, such minimal sequences are the exception rather than the rule. For there is a second principle to the effect that, at any point after the initiating move, a participant can, while still minimally or implicitly fulfilling the expectations of the preceding move, step up the prospectiveness of the current move so that it, in turn, requires or expects a response. In effect, what this does is to initiate a further, dependent exchange, in which some aspect of the preceding exchange is extended or qualified in some way.

Adopting this analysis, we can now see the similarity between tne two examples above. In both cases, the adult uses this 'follow-up' strategy to involve the child(ren) in an extension of the 'content' that has been co-constructed up to that point. In the first example, this strategy is used three times. In (2), the mother makes a D move where only A is expected, thereby requiring Mark to extend his own initial observation. In (4), she makes a G move in place of the expected A and offers a more accurate formulation of the birds' activity; she also adds a tag, which has the effect of making her move more strongly prospective (G+), thus requiring Mark to confirm her formulation. And in (6), she once more substitutes a G for the barely expected A in order to add information which relates the observed event to a cultural pattern more familiar to the child. And, since her G move expects an A in response, Mark duly obliges with a minimal "Oh", which brings the sequence to a close.

In the second example, the strategy is used only once. The expected structure of the nuclear exchange is D-G-A, with the teacher contributing the first and third moves. However, in place of the A move, the teacher steps up the prospectiveness by making a G move, in which she reformulates the student's response so that it may be more clearly understood by the other members of the group. In this case, however, the dependent exchange that she initiates does not close with an overt A move from the student(s) - and it rarely does in triadic dialogue - as, without pausing, she goes on to initiate a new sequence, and the episode continues in similar format, with the students contributing accounts of what they learned and the teacher adding, after each response, a dependent exchange in which she builds towards a more complete and systematic account of what the class as a whole have been engaged in learning.

The point of introducing this comparative analysis of the two examples, then, has been to show how, in very different contexts, the use of the same basic strategy of exploiting the possibility for <u>follow-up</u> within a sequence in progress allows a more knowledgeable participant to contribute to the learning of the less knowledgeable in ways which nevertheless incorporate and build on the latter's contributions. This is essentially what responsive

teaching means at what I earlier described as the micro level of teaching. And, viewed from this perspective, both the episodes presented in the earlier part of this paper (pp.) can be seen to fit this description. Nevertheless, there are significant differences between them in the ways in which they perform this teaching function. Furthermore, they are only two of the options that can be taken up in a follow-up move.

In their pioneering scheme of analysis, Sinclair and Coulthard (1975) propose three categories of act that can occur in the follow-up move of a triadic dialogue exchange: 'accept' (including reject), 'evaluate' and 'comment'. This latter category includes the more delicate sub-categories of 'exemplify', 'expand' and 'justify', each of which, according to the analysis proposed here, is realized through the initiation of a dependent exchange in which the teacher makes a G move. Put in different terms, by exploiting the scale of prospectiveness, a dependent exchange can be added on to the nuclear exchange and the various sub-categories of comment used to relate the current sequence to the personal experience of one or more of the participants or to some more systematic knowledge structure which has been built up within the classroom community or is imported from the relevant discipline. Example 4 provides an instance of the former and the following sequence, taken from a little later in the same episode, provides an instance of the latter (44).

The various timing devices the children have made have been considered from the point of view of their accuracy and this has led to the principle of controlling all but the experimental variable.

Example 5.

40 T:	Why must we control our variables?	Nuc. I Req. Information
41 Te:	Because if we don't, the time won't be accurate and so you won't get the correct timing	Nuc. R Inform
42 T:	Not so much the TIME is not accurate . what is not accurate?	Nuc. F Qualified Reject Dep. I Req. Clarification
43 Bi:	It's not a fair test	Dep. R Clarify
44 T:	It's not a fair test . a fair test (writing on board) Your experiments are your tests . the fair test- all your various methods would not be . fair, 'fair' here meaning 'consistent' (writing on board)	Dep. F Accept Extend

In the North American tradition (e.g. Mehan, 1979), Evaluate is the term used to designate the third move of every triadic dialogue exchange (I-R-E), and not just one of its functions - no doubt because this is the function that it is most frequently observed to perform. However, this functional category, too, consists of more delicate sub-categories, which include, in addition to 'accept' and 'reject', 'reformulate' (restating a student's response in a clearer or more accurate form) and 'correction' (where the teacher provides an alternative response that

is to be heard as more appropriate than the one supplied by the student).

Newman et al. (1989) describe these follow-up interventions in terms of 'gate-keeping':

> Rather than seeing it primarily as an evaluation of the child speaker, [Griffin and Humphrey (1978)] demonstrated that the third part of the sequence acts as a gatekeeper for the content of the lesson. Unless a teacher goes into a lecture format, this gate-keeping turn is about the only thing that a teacher can use to make sure that the proper information is available for learning and that improper content is removed from consideration by the lesson participants. In essence, the three parts can be seen as one assertion that is collaboratively constructed by the teacher and the children. (p.125)

A very similar argument is made by Edwards and Mercer (1987) for the use of moves with these functions in the interest of jointly constructing what they call 'common knowledge'.

One feature shared by all the functions of follow-up moves so far discussed is that it is the teacher who, in the dependent exchange, does the work of supplying the "proper information" or of making connections to other bodies of knowledge - albeit in a responsive manner that takes account of the student's contribution. However, there is another group of follow-up interventions that invites the student to perform this role. These typically occur in dependent exchanges initiated by a move in which the previous speaker is requested to perform the very same functions as are performed by the teacher in the third move of triadic dialogue. Thus, the request may be to 'clarify', 'exemplify', 'expand' or 'explain', or it may take the form of a challenge to the speaker to 'justify' a proposal (or a proposition presupposed by that proposal). Instances of some of these functions can be seen in Example 2 above and in the second exchange (42-43) of Example 5. The final outcome of the sequence - an increment in the group's common knowledge - is often similar to that arrived at by means of triadic dialogue, but the distribution of responsibility in achieving it is very different. For here it is the student, rather than the teacher, who does most of the work involved in producing the acceptable formulation.

In focusing on the various ways in which a teacher can initiate a dependent exchange to follow up on a student move, I have, in effect, been developing an account of an important set of discourse 'operations' that she or he may use, both strategically and responsively, to mediate the 'action' of teaching at what I earlier called the micro level. In order to understand better when and why the different alternatives are selected, however, we need to return to the 'activity system' as a whole and, in particular, to the nature of the goals which direct the participants' 'actions'.

Determining the Goals of Classroom Activities

Let me start by attempting to bring together the various strands of the foregoing discussion in a synoptic representation of the overall descriptive framework that is being proposed. This is set out in table 2. The two dimensions of the table correspond to two different ways of conceiving of 'enactment'. On the horizontal dimension, the relationship is that of realization, as proposed in Leontiev's tristratal theory of 'activity'. On the vertical dimension, by

contrast, the relationship is that of constituency: units at higher levels consist of one or more units at the level next below. Inevitably, this representation is extremely schematic and non-specific, as it is intended, in principle, to account for the full range of variability that occurs across classroom events as a result of differences in: age of the students, curricular area being addressed, resources available, as well as the teacher's 'philosophy of education'. Furthermore, it makes no attempt to represent the dynamic dimension of 'enactment', as events are coconstructed over time. Despite these limitations, however, it does provide a useful summary of the main categories previously discussed and of the relationships between them.

[Insert Table 1 about here]

The next step towards filling out the framework is to incorporate the model of an 'activity system' proposed by Engestrom (1990), which was presented in figure 1 (p.) above. However, since an expanded triangle of mediated action applies at every level in the hierarchy of 'action', I will not attempt to represent the resulting framework here. Nevertheless, that model does supplement table 2 in a number of important ways, notably by introducing the influence of the situational categories of 'rules', 'community' and 'division of labor' into the relationships of realization, and by making clear that there are different perspectives on the enactment of the 'activity system' depending on who is in the 'subject' position. This is nowhere more apparent than with respect to the goals and mediating artifacts that are associated with the different levels of 'action'.[12]

As I have pointed out elsewhere (Wells, in press a), there is no guarantee that, even in a classroom organized to foster collaboration, there will be agreement about the goals that are being pursued at any time. There are two major reasons for this. First, the goal may not have been made (sufficiently) explicit, and participants' individual construals of the situation may result in a diversity of interpretations. This is particularly likely to take the form of mismatch between the teacher's goals and those constructed by the students, as for example, when the class is dispersed to carry out practical work in groups or individually. The second major cause of goal mismatch arises from conflicting agendas. Such conflict may well occur when the teacher's goals do not engage the students' commitment to the task in hand, but it can also occur between student members of a group that is fully engaged in the task but where individual members have different ideas about how the task might best be carried out.

Any of these forms of goal mismatch inevitably impact on the smooth running of the 'operations' through which the 'action' is realized and can frequently be detected in the discourse, as goals are renegotiated or participants draw attention to the mismatch. The example, cited earlier (p.), where the 'operation' of making a prediction before carrying out an experimental trial was stepped up to become the 'action' focused on in teacher-led discussion, may well have been precipitated by one or more of these types of goal mismatch when the groups were actually carrying out the experiments on the previous day (Wells, in press a).

However, there is another way in which table 2 oversimplifies the status of goal in relation to 'action', for it seems to suggest that, at every level, the goal is both determined in advance and constant throughout the 'operationalization' of the 'action'. Indeed, for these reason, the very notion of goal is problematic to some sociocultural theorists.[13] Rather than reject the

concept altogether, however, I would suggest that we think of goal-orientation as forming a continuum from goals that are predetermined and stable at one end, through emergent goals, to goals under negotiation at the other. I also think it is important to emphasize the orientational function of the goal rather than thinking of it as a determinant of 'action'.

As Lemke (e-mail, 29 Oct. 1993) has pointed out, the notion of a stable goal is incompatible with the reality of the move-by-move co-construction of discourse, in which each move is strategically made in the light of what has preceded; the goal which is at the current focus of attention cannot, therefore, be pre-scripted in advance of the moment of utterance. In fact, the same is true of any form of joint activity, if the participants are responsive to each other's contributions and to the constantly changing situation which results from these contributions. Whether the goal is operationalized through discourse or through some other form of semiotic mediation, new possibilities are constantly being opened up at each step in the action and, in responding to these, the participants necessarily modify the goal to which they are orienting to a greater or lesser degree. Lemke, in fact, suggests that the goal can only be determined in retrospect, once it has been achieved. In other words, the concept of goal is one that can only be derived from post-hoc analysis of the completed trajectory of 'action'.

While recognizing the force of this argument, I do not think it should lead us to abandon the concept. Instead, we should recognize that the goals to which participants are orienting are always to some extent emergent, and that this tendency increases the lower one goes down the scale of 'action'. In fact, just as there is a hierarchy of 'action', so too there is a hierarchy of associated goals, with those at lower levels being increasingly sensitive to the specifics of the unfolding situation. Particularly in classrooms where the students work for much of the time in groups and in which they are encouraged to share in the planning and execution of the tasks that they undertake, therefore, we should expect to find that, at the level of task and step, goals are emergent and negotiated. On the other hand, this does not preclude the appropriateness of relatively stable goals at the higher levels of curricular activity and of the curricular unit as a whole, that is to say, goals which are selected by the teacher, perhaps after some degree of negotiation with the students, and then announced in the expectation that they will serve as a basis for the formulation, evaluation and modification of lower level goals as the action progresses. Indeed, without some organizing goal structure of this kind, it is difficult to see how the thirty or so members of the classroom community could work together productively within the constraints of limited space, time and resources.

However, when the emergent nature of lower level goals is taken into account, it is easy to understand why participants may sometimes have different ideas about the current goal - leading to uncoordinated, or even conflictual, 'operations'. It also explains the difficulties that are frequently experienced by analysts as they attempt to segment the transcribed stream of discourse into episodes and sequences. For, when goals are progressively negotiated as events unfold, boundaries are not clear-cut, and the transition to a new action unit may only be recognized by all participants as having occurred some moments after it was initiated by those who brought it about.

Contextualizing the Opening Examples Within their Activity Systems

With these qualifications in mind, I should like to return to the two examples quoted at the

beginning of this paper, setting them in the larger context of the 'activity systems' in which they occurred. By so doing, I hope to be able to provide a plausible, although tentative and incomplete, explanation of the differences between them with respect to the discourse microgenres that were deployed. For purposes of comparison, I present the most relevant information in tabular form (see table 3).

[Insert Table 3 about here]

Despite the one to two years difference in age between the two groups of students and the difference in the topics under investigation, there are considerable similarities between the two classrooms, as compared, say, with the science classrooms reported in Edwards and Mercer's (1987) study. Here, a dominant goal in both classrooms is for the students to master practices of inquiry and, to this end, they are encouraged to contribute to the formulation of the goals and procedures that will guide their activities. However, although student suggestions are taken into account, it is the teacher who ultimately controls the timing of curricular activities and sets and announces the goals for each lesson period. Student initiative in goal-setting and choice of means to be used (e.g. the balance between practical as opposed to library-based evidence) is thus largely exercised within a common superordinate goal structure, which remains relatively stable, at least for the duration of individual lessons.

If the 'activity system' as a whole is similar in the two classrooms, what might account for the difference in the microgenres deployed in the sequences contained in the two examples? Here, it seems to me, there are a number of factors, none of which is uniquely responsible, but which, taken in conjunction, provide a convincing explanation. First, the task itself and its timing in relation to previous activities undertaken. In the grade 6 class, the study of the developmental cycle of the painted lady caterpillars occurred towards the end of a year in which the students had gained considerable experience in conducting inquiries into topics of their own choosing within an overall theme. Furthermore, they had already spent a considerable amount of time formulating questions and collecting observational evidence concerning development at the earlier, caterpillar stage. They therefore had relevant knowledge and experience to draw on in carrying out the task set by the teacher, the goal of which was to formulate further questions for their group's investigation of the current chrysalis stage of development. By contrast, the students in the grade 4/5 class had little previous experience of inquiry learning, except through library-based research. Additionally, the activity in question occurred early in the curricular unit and was concerned with developing an overall plan for the unit; furthermore, the task of generating suggestions concerning relevant parameters occurred at the beginning of the activity.

A second group of factors of considerable importance was the size and constitution of the 'community' immediately involved in each event and the 'division of labour' amongst the members. In the grade 4/5 activity, all the students in the class were gathered in a circle on the carpet, with the teacher as leader and animator. Her goal, which she announced to the group, was to elicit suggestions, on the basis of which they would develop a plan to which they would then be expected to orient in the subsequent lesson periods devoted to the unit. There was thus a clear outcome in view for the teacher which, although unknown in its specific details, involved working towards concensus both about what was to be done and about the reasons for the decisions made. The initial task, from her perspective, therefore,

was to establish procedures that would lead to this outcome and to initiate the students into these procedures by actually engaging with them in their 'operationalization'. In terms of the task goals, then, while the goal of engaging in collaborative exploratory discussion was set and maintained by the teacher, the goals concerning content were emergent, depending on the specific suggestions made by the students.

In the grade 6 event, the class teacher had already set the goal for the task, and the group of three boys was engaged in carrying it out when they were joined by the visiting teacher. Both as visitor to the class and as temporary member of this community, the teacher did not have the same authority as the class teacher would have had, if she had been present; he also had no preconceived outcome in mind in joining the group. There was thus no status-based division of labour, although, as a teacher, the visitor was prepared to intervene if he thought he could assist the group in achieving their goal.

With these differences in mind, we can now turn to some of the features of the selected microgenres themselves with a view to explaining the types of follow-up that occurred. As already pointed out, the episodes differed with respect to the parameter of Topic Control. In the weather unit planning episode, for reasons discussed above, the teacher chose to engage the students in 'unequal dialogue', in which she controlled both topic and turn-taking. Her selection, at sequence level, of the triadic dialogue microgenre thus set up the expectation that the teacher, who initiated each sequence, would also make a contribution in the third, follow-up move. However, since she wished to have an 'exploratory' Topic Focus at this stage, it was important not to use the 'evaluative' subcategory of the triadic dialogue microgenre. She therefore exploited the follow-up move in ways that extended the student suggestions in order to make clear that all suggestions would be given a positive reception.

In the caterpillar episode, by contrast, it was natural that, amongst this small group of students, Topic Control should be distributed and, when the visiting teacher joined them, he tried to participate in a manner that would maintain this mode of dialogue. This is seen in the fact that, in both the sequences quoted, it was a student who was the initiator and another student who was the first to respond. With respect to Topic Focus, although the overall mode was exploratory, once a candidate question had been accepted, the microgenre selected - for which we have, as yet, no label - was a form of collaborative debate in which an attempt was made to construct a warrantable answer that all would accept, at least as a working hypothesis. It was in this context that the visitor intervened to clarify the argument so far and to challenge his coparticipants to justify their proposals. And in so doing, he clearly acted as a teacher, attempting to assist his fellow participants to use the microgenre effectively to construct an answer to their question and, at the same time, providing an opportunity for them to recognize and appropriate this discourse tool.

There is, however, a further difference between the two episodes that may well be of significance for the types of follow-up that occurred. As has already been noted, the sequences in each episode involved candidate items for consideration that were contributed by one or more of the students. However, although the items in each case shared the feature of tentativeness, they concerned different perspectives on reality. In the weather unit, the candidate items were suggestions concerning future activity on the part of the community; in terms of the ancillary-constitutive parameter discussed above (p.), they were thus action-oriented, falling into the category of 'planning action'. By contrast, in the caterpillar unit,

the items were proposals about the way the world is, put forward in the form of questions; although answering the questions might subsequently involve action on the part of group members, the actual consideration of the questions themselves constituted a mode of discourse that could be categorized as incipient 'theorizing'.

Do these two modes of construing experience through discourse, that Halliday (1993) dubs synoptic and dynamic, tend to elicit different types of follow-up? Certainly, one of the most important lessons that students must learn in studying science is that theories about the material world need to be grounded in evidence from observation, and so the teacher's strategic challenging of the theory-evidence connections that were implicit in their proposals can be seen as part of a microgenre that is central to the synoptically-based discourse of science. The suggestions offered for the organization of the weather unit, on the other hand, belong more naturally to the domain of interpersonal negotiation of action, where differences in personal preference are to be expected; here, it is more appropriate to listen to each suggestion and explore its possibilities rather than immediately to challenge its feasibility. These different stances towards experience suggest another possible reason for the teachers' different follow-up moves: A request to justify the grounds for a move just made is much more challenging than an extending or exemplifying comment, and may be more readily accepted in relation to a synoptic proposal in which one is not personally involved than in relation to a dynamic suggestion in which one is. Or perhaps they are equally acceptable in either mode - provided that other conditions are met, such as the addressee not being made to look stupid in front of his or her peers. From this point of view, a challenging follow-up is not as face-threatening in a small group setting as it is when the whole class is involved.

While these explanations must be treated as no more than speculations in the absence of corroboration from the participants involved, what they do make clear is that the choice of the sort of follow-up move to make is a highly strategic one. For it must simultaneously both respond to the ideational and interpersonal dimensions of the sequence in progress and also steer the ongoing episode in the direction required to achieve the goal of the 'action' that the discourse mediates. From this point of view, the follow-up move can be seen as the essence of what I earlier called the 'micro' level of teaching.

However, given the real-time pace of spoken discourse, it is clear that teachers do not have time to consider all the implications of the options available to them at each point when a follow-up move might be made. Rather, the choice of option is an 'operation' in exactly the sense intended by Leontiev: it is both below the level of conscious attention and also strategically directed towards the goal of 'action' in the conditions that are perceived to prevail. Finally, therefore, in order to explain why one follow-up option is selected rather than another - or, indeed, one microgenre, task or activity - we must also consider the conception of teaching and learning that guides the teacher's behaviour at every level.

Conclusion: Education as Transformation

One way of thinking about the effects in practice of different conceptions of teaching is in terms of the 'rules' that figure in Engestrom's expanded triangle of mediated action. As he points out: "In traditional school learning," these rules include "those that sanction behavior and regulate grading" (p. 249). They also include 'rules' that concern such matters as the

degree to which curricular subjects are integrated or kept firmly separated, the relationship between the macro and micro levels of teaching and, more generally, whether the pedagogy is 'visible' or 'invisible' (Bernstein, 1975).

To adopt the 'rule' perspective on such differences between classrooms seems to carry with it an implication of external constraint. And, indeed, in some schools, teachers do work under quite severe constraints of curricular content, programming, norms of movement and noise level, and so on. However, in most jurisdictions - and certainly in the schools in which we have worked - teachers have considerable discretion in deciding how to 'implement' the curriculum in the day-by-day events that make up their programs. Although suggestions or recommendations may be made by administrators at various removes from the classroom, in the last resort, it is the teacher who decides whether to have students working collaboratively in groups or to 'teach' them from the front of the class; whether to value conjectures, supported by argument, or 'correct answers', as defined by the textbook; whether to attempt to get all students to achieve the same outcomes at the same time, or to recognize the various forms of diversity in the student community and to tailor expectations to take account of these differences, while still negotiating appropriate challenges for each individual and providing the assistance that each needs in order to meet them.

Differences of these kinds between classroom communities cannot be attributed solely to external constraints or, conversely, to externally imposed reforms; for they constitute the enactment of deeply held (albeit often intuitive) beliefs on the part of the teachers concerned, rather than 'rules' that are simply followed because they represent the local norm.

An alternative way to think of such differences - which gives greater recognition to the teacher as agentive decision-maker - is to combine the notion of rules with Halliday's concept of register. Register, it will be recalled, accounts for the reciprocal relationship between situation-type and the choices that are made from the total meaning potential, through the mapping of the semiotic dimensions of field tenor and mode on to - in the case of the linguistic semiotic - the ideational, interpersonal and textual metafunctions in terms of which the semantic potential of language is organized. As I have argued elsewhere (Wells, 1993a), the value of this concept for thinking about educational change is that it provides a way of understanding how, through semiotic choices made in terms of the 'actions' and 'operations' that are selected, the teacher can change the larger situation, or, in the terms of activity theory, can instantiate a particular version of the practice of education.

Take, for example, the set of follow-up options that are available to the teacher when responding to a student contribution. Continually to choose the 'evaluate' option - whether accepting or rejecting - does much to create a situational context in which right answers will be given priority by students. By contrast, frequently to choose the extend option creates a different context, one which emphasizes the collaborative construction of meaning - in the setting of goals to be aimed for and in the construction of 'common knowledge'. And the choice of the options which call upon students to justify, explain and exemplify creates yet another context - one which encourages students critically to examine and evaluation the answers that they make to the questions that interest them and which simultaneously apprentices them into the 'genres of power' (Lemke, 1988).

Of course I am not suggesting that these discourse moves alone can create alternative

realizations of the practice of education. But when they are deliberately but responsively deployed in the context of congruent choices with respect to options at other levels in the hierarchies of genre and 'action', they can indeed create different 'communities of (educational) practice', with different 'rules' and 'division of labor'.[14]

In much of the research in the human sciences, the emphasis has been on investigating how 'activity systems' determine the ways in which 'action' is 'operationalized'. This is the most straightforward way to interpret Wertsch et al.'s (1984) comparison of the ways in which the mothers and teachers of lower class Brazilian children assisted them in the completion of a model. The mothers' more directive behaviour was explained in terms of the different 'activity' into which they assimilated the 'action'. In comparison with the teachers, who engaged the children in the 'activity' of education, the mothers treated the task as just one more job, to be completed as efficiently as possible. The concept of register, by contrast, invites us to consider the converse relationship - how changing the 'operations' by means of which a task is carried out can ultimately change the 'activity system' in which the task is embedded.

It is possible for teachers to transform the practice of education. If they choose to, they can make of their classrooms, communities in which members engage collaboratively in actions which they find "socially relevant"; in which they are assisted to appropriate the valued resources of the culture, including artifacts and skills that are not purely linguistic; and in which individual creativity and diversity of culture, class, and gender are also recognized and valued. But, to make these transformations, as Tharp and Gallimore (1988) so cogently argue, they need assistance in exactly the same way as their students do.

For those who would provide this assistance, there are also choices to be made. Our belief is that, if we wish to see classroom communities of the kind just described, we must create similar communities of practice, in which teachers and researchers work collaboratively on inquiries into how to bring about these changes in the practice of education. All the teachers whose classrooms have provided the examples discussed in this paper are involved in this sort of inquiry. By selecting which aspects of their practice they wish to problematize, and by critically examining the observational data gathered by the researchers, together with other evidence that their students provide, they are taking charge of their own professional development and using the resources of these different communities to achieve the goals that they consider important. And, because their inquiries, and ours as researchers, intersect with those of their students, a larger community is formed, in which multiple forms of demonstration and assistance are providing opportunities for all of us to learn and develop.

NOTES

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2. Before proceeding further, it is necessary to address the issue of terminology. Unfortunately, it is difficult to use the terms 'activity', 'action' and 'operation' without ambiguity as, in addition to the technical meaning they have as categories within Leontiev's theory, they each have a more general, non-technical meaning in everyday usage. The term "activity", in particular, has a meaning in educational discourse that is very similar in scope to the term 'action' within the theory. One possibilty would be to invent a new term for each of the strata in Leontiev's model - as I am proposing to do by referring to the "practice of education". However, this would cause a different sort of confusion for those already familiar with these terms, as they are used in discussion of activity theory. The solution I have adopted, therefore, is to signal through the use of single quotes when I am using 'activity', 'action' and 'operation' to refer to the strata within Leontiev's model. When the terms are used without quotes, on the other hand, I intend them to be understood as they are used in non-technical discourse about classroom events and about human behavior more generally.

3. The terms used to refer to the levels in terms of which the curriculum is organized may well vary from classroom to classroom. However, whatever the terms used, this hierarchically organized stucture of 'action' is a universal feature of the practice of education in schools.

4. A complicating factor is that there is not a simple one-to-one relationship between the three strata. A single 'action' may simultaneously realize more than one 'activity', depending on the way in which it is 'operationalized'. For example, in choosing to have students identify peers who are absent as the means of carrying out the 'action' of taking attendance, the teacher's object may be to build a sense of community in the classroom as well as to achieve the object of the custodial 'activity' in an efficient manner. As we shall see below, such polyvalence of 'operations' is the rule rather than the exception, making the unambiguous assignment of tokens to types a coder's nightmare.

5. This second characteristic of an 'operation' - that it is a routinized form of behavior that was once an 'action' that needed to be given conscious attention - helps to clarify the hierarchical organization of 'action'. Any 'act' (to choose a term that is neutral with respect to the theory under discussion) can, on different occasions, figure as 'action' or as 'operation'. Which category is chosen depends on the focus of attention. This applies both to the subject

who is performing the action and to the analyst who is trying to understand it. So, in the case of driving a car, the driving may function as an operation for a subject whose focus is on the 'action' to be carried out on arrival at the destination, or as an 'action' while he is negotiating a tricky highway intersection. Similarly, from the analyst's perspective, the driving will be treated as an 'operation' when it is the subject's work patterns that are under investigation, and as an 'action' when the focus is on the driver's coordination of multiple sources of information. Put more generally, most 'acts' of any complexity cannot be treated as unequivocally 'actions' or 'operations' independently of the context in which they are situated.

6. As will be discussed in more detail in a later section of the paper, there are two basic discourse roles: Demand and Give. Demand is always associated with the Initiating move; Give is associated with both the Response move (Give-on-Demand) and the Initiating move (without demand). What is given in an exchange (with or without demand) is referred to by Halliday (1984) as the Commodity. In the scheme presented here, commodities include: Information, Suggestion, Justification, etc. The combination of commodity and discourse role is what we refer to here as Function. For example, when Information is combined with Demand, we have the function 'Request Information'; when Information is combined with Give, we have the function 'Inform'. The function 'Inform' is thus common to both the Initiating and the Response moves.

7. The level above Sequence is that of Episode, that is to say, all the talk corresponding to an activity or one of its constituent tasks. It seems quite likely that it will eventually be possible to distinguish different subcategories of sequence according to their function within an episode (Coulthard, 1977) but, as yet, we have no firm proposals to make on this issue.

8. 'Backchannel' is the term used for a contribution made by listener in the course of a speaker's turn to signal that he or she is following the speaker's drift; such contributions do not constitute 'moves', in the sense intended here, as they occur within rather than after the move to which they are related (cf. Coulthard, 1977, p.62).

9. Other possibilities exist, however; notably, making one the realization of the other. For two such, opposed, interpretations, see Hasan (1985/89) and Martin (1992).

10. Although using somewhat different terminology to refer to the units in terms of which the discourse is analysed, Pontecorvo et al. (1990) have developed a somewhat similar analytic framework to investigate the forms of reasoning that occur in group discussion.

11. The situation is actually more complicated than I have intimated here. As is made very clear in Labov & Fanshel's (1977) analysis of therapeutic discourse, individual moves can - and frequently do - perform more than one function simultaneously. In particular, even when apparently most focused on the ideational content of the sequence, participants are always engaged in negotiating their interpersonal relationship as well as their affective stance to the topic under discussion and to the manner in which the discourse is proceeding. Furthermore, what 'counts' as the dominant function of a move or sequence depends on a) whose perspective one takes, and b) on the uptake by the interlocutors, as evidenced in their subsequent moves. To put it more generally, therefore, the function of a sequence, or of its

constituent moves, is not given unambiguously in the surface form but is the outcome of negotiation among the participants, which may result in different functions being treated as dominant.

12. See, for example, Engestrom's discussion of the different roles in the mediation of action performed by the same tool when seen from the perspective of different subjects in 'When is a tool? Multiple meanings of artifacts in human activity' (1990, chapter 8).

13. This became abundantly clear in a recent e-mail debate (October-November, 1993) on the xclass network (organized by Michael Cole from the University of San Diego), in which a number of participants rejected the concept of goal as altogether unhelpful. The position I outline here owes much to my involvement in that debate and I should like to take this opportunity to express my gratitude to all those who took part.

14. At first sight, there may appear to be a contradiction here. Earlier, I argued that the choice of follow-up move was made below the level of conscious attention. While I believe this to be the case, it is still possible for a teacher deliberately to adopt a stance that makes the deployment of some options rather than others the 'preferred' response to the way in which the discourse unfolds. In fact, the deliberate adoption of a particular stance is part of what is involved in being a "thoughtful practitioner" (Atwell, 1991).

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Table 1. Categories to Describe the Organization of Discourse

Unit of Analysis	Type	Function
Move	Initiate	Demand, Offer, Request Information Suggest, Check, etc.
	Respond	Give Information, Suggest, Confirm, etc.
	Follow-up	Acknowledge, Evaluate, Extend. etc.
Exchange	Nuclear	Goods-and-Services, Information
	Dependent	Amplification, Justification, Reformulation, etc.
	Embedded	Repair
	Preparatory	Channel
Sequence		

Table 2. The Enactment of the Practice of Education

'ACTIVITY' (Motive)		'ACTION' (Goal)		'OPERATION' (Means)	
Practice of Education	(a) cultural reproduction (b) development of individual potential (c) fostering of communities of practice	Curricular Unit	Increasing mastery of:- (a) content knowledge (b) discipline-based practices (c) tools & artifacts (d) metacognition (e) collaboration		
		Curricular Activity	Outcomes related to (a)-(e) above	Use of semiotic tools, incl. spoken discourse	Curriculum genre (cf. Christie, 1991)
		Task	Completion of a component of an activity outcome	Co-construction of episode of	<Speech genre>
		Step	Contribution to outcome of task	Co-construction of sequence	Microgenre e.g. triadic

dialogue

Table 3. Discourse Episodes in Activity Systems in Two Classrooms

	Example 1	Example 2
Curricular Unit		
Topic:	Understanding the Weather	Life Cycle of Butterfly
Teacher's Dominant Goals:	(a) Content knowledge (b) Practices of inquiry (c) Collaboration	(a) Practices of inquiry (b) Collaboration (c) Self-evaluation (d) Content knowledge
Activity		
Stage in C.U.:	Early: before starting inquiry	Late: after observing caterpillars
Teacher's Goal:	Plan organization of C.U.	Continue self-selected inquiries
Object:	Not yet decided	Chrysalis
Mediating tools:	Spoken discourse, lists of individually generated questions	Magnifying glass, etc.; reference books; spoken discourse
Task		
Preceding Task:	None	T's directions to generate questions
Participants' Goal:	Generate suggestions for planning curriculum unit	Generate questions for group's further inquiry
Mediating Tools:	Spoken discourse	Spoken discourse
Community:	Teacher with whole class	3 students with visiting teacher
Division of Labor:	T. controls topic and turns	Shared control of topic and turns

Figure 1. Engestrom's (1990) Model of an Activity System

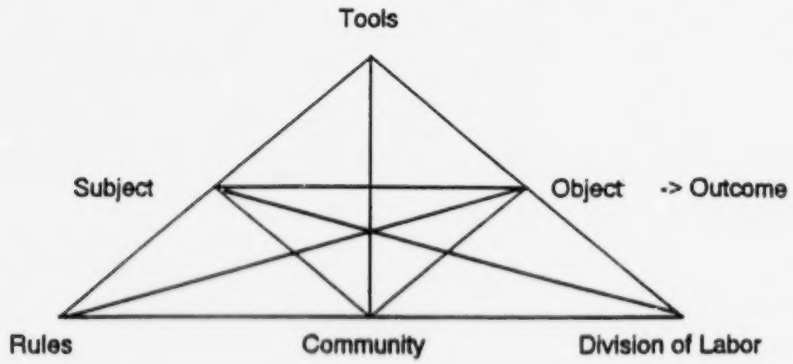
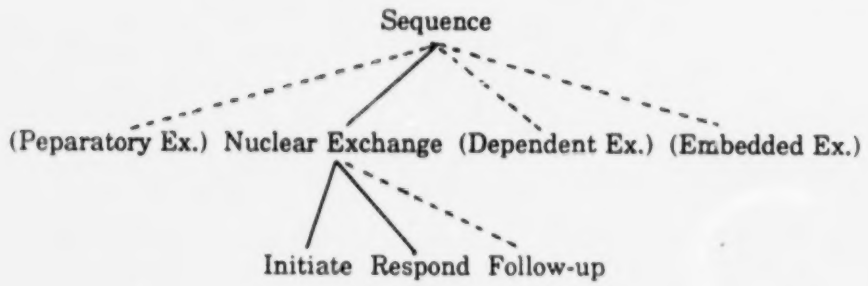


Figure 2. Organization of Spoken Discourse



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